REMARKS

Claim Rejections Under § 103(a)

Applicants respectfully disagree with Examiner's assertion that claims 1-5 and 16 are unpatentable over U.S. Patent No. 4,567,765 issued to Rao et al. (Rao) in view of U.S. Patent No. 6,039,059 issued to Bran (Bran).

Rao is directed towards a high pressure-high temperature system for testing fluid samples ultrasonically. Specifically, Rao discloses a fluid chamber assembly that has an improved shape to enhance the reception of a signal by a receiving transducer from a transmitting transducer by reducing the distance between the respective transducers. Rao also teaches an improved sealing arrangement that allows the chamber to operate without leakage of the sample at high pressures. Rao fails to teach the use of a housing to isolate the transducers from the high temperatures and pressures in the autoclave reactor and fails to teach or suggest a means for cooling the transducers.

Bran discloses a cleaning system for semiconductor wafers using a singular transducer to produce megasonic energy to agitate fluid on the wafer to be cleaned. It also teaches a housing around the singular transducer and a heat transfer member that has an inlet and outlet for coolant to control the temperature within the housing. Bran fails to teach the use of a housing to isolate a transducer from high pressures or high temperatures contained within the container it is separated from. It also does not teach a housing that contains transducers that will be emitting or receiving ultrasound signals to analyze the concentration of a mixture. Nor does Bran teach the use of more than one transducer to measure ultrasonic signals.

Examiner states it would have been obvious for one skilled in the art to arrive at the invention in Applicant's claim 1 upon viewing Rao and Bran. Claim 1 is directed towards an apparatus for measuring the concentration or particle size of a slurry, comprising a sealed container to hold the slurry and apply elevated heat and pressure to the slurry, transducers for receiving and transmitting ultrasonic signals, and couplers connecting the transducers to the sealed container to isolate the transducers from the heat and pressure in the sealed container. The use of the couplers is critical to the present invention to maintain the transducers at temperatures below 60°C, while the temperature within the sealed container exceeds 265°C. The couplers also allow for the maintenance of the transducers at atmospheric pressure, while the pressure in the container containing the slurry is as high as 200 p.s.i. See Applicant's Original Specification, page 3 lines18 through page 4 line 1.

Rao does not teach or suggest modifying the structure of the assembly to protect the transducers from the high temperatures or pressures within the reactor. Rao is concerned with allowing the chamber to function under high pressures without leaking of the cement sample from inside the chamber assembly. Rao does not suggest that the elevated pressures or temperatures applied to the sample may affect the function of the transducers or that it would be necessary to isolate the transducers from the pressure and temperatures inside the assembly containing the slurry. The housing used in Bran separates the transducer from the container and is used to support the probe, not to protect the transducer from the temperatures within that container. See Bran, column 2, lines 22-24. Nor does Bran suggest or teach that the housing used, or any housing, would be able to achieve the objective of protecting the transducer from heat or pressure within the container or that it would be advantageous to do so. This is the case because Bran is not concerned with the temperature and pressures within the container, just as

Rao is not concerned with protecting the transducers from the temperatures and pressures within the container. This indicates that the knowledge of using the housing to isolate a transducer from a hostile environment within a container was not generally known, either in the art of wafer cleaning or measuring slurry concentrations. The fact that Rao or Bran may be modified in a manner suggested by the Examiner does not make it obvious unless the prior art suggested the desirability of the modification or the knowledge was generally known in the art. In re Fitch, 972 F.2d 1260, 1266 (Fed. Cir. 1992). Therefore, because neither Rao nor Bran suggested or taught the desirability of protecting the transducers from the elevated temperatures and pressures within the container by isolation of the transducers, *see* Applicant's Original Claim 1 lines 13-15, and such modifications for their purpose were not generally known in the art, it was not obvious for the Applicants to have done this.

Additionally, Applicants maintain their position that Bran is in an art that is not analogous, nor is the reference reasonably pertinent to the particular problem with which Applicants are concerned. The art of measuring the concentrations or particle sizes of slurries is substantially different and distinct from the field of cleaning semiconductor wafers. It would not be expected that a person looking to measure concentrations of mixtures would be concerned or knowledgeable in those things that are relevant in the art of cleaning semiconductor wafers. While transducers may be used in both fields, they achieve different objectives by different means, including use of energy levels that are magnitudes apart and use of a housing for support means versus isolation means in the case of the Applicants invention. Furthermore, Bran does not deal with the same problem as that which the inventor is involved with, that of protecting transducers from the hostile environment of high temperatures and pressures inside a container. Bran deals with the problem of improving the cleaning methods of semiconductor wafers through the use of a transducer, and cooling this transducer to protect it from the heat generated by its own operation, not heat that is produced in a different chamber. This further indicates that the housing in Bran is not in the same field nor is the housing used to solve the same problems, and therefore, cannot be used as a reference to show obviousness or to show knowledge of one skilled in Applicants' art.

Additionally, the combination of the two references suggested by Examiner would not result in the Applicant's invention without destroying the purpose of the invention in Rao. The sealed container, or chamber assembly, in Rao consists of a body, top, bottom and seal assembly. The purpose of the invention in Rao is to create an improved shape of the chamber assembly to significantly improve the detection of the first arrival of the signal from the transmitting transducer by reducing the distance between the transmitting transducer and the receiving transducer placed in bores within the assembly. See Rao, column 3 lines 42-45. Applicant's invention in claim 1 calls for the placement of the isolating coupler on the lateral outside wall of the container, to do otherwise would destroy Applicant's invention by exposing the transducers to the environment within the container. Providing means for isolating the transducers outside the sealed container, or chamber assembly, in Rao would greatly frustrate the purpose in Rao of reducing the distance and improving the detection of signals between the transmitting and receiving transducer by increasing the distance between the transducers. See Rao, column 3, lines 43-48. This results because the transducers would necessarily be outside of the chamber assembly, as in Applicant's invention, and a greater distance apart from each other than would be allowable in Rao in order to achieve the object of the invention of reducing the distance between transducers. If a prior art reference is cited that requires some modification in order to be properly combined with another reference and such a modification destroys the purpose or function of the invention disclosed in the reference, one of ordinary skill in the art would not have found a reason to make the claimed modification because the reference essentially teaches away from the proposed modification. In re Gordon, 733 F.2d 900, 902 (Fed. Cir. 1984). Therefore, if one skilled in the art attempted to make this modification to Rao, in view of Bran, the object of Rao's invention would be destroyed, and therefore, it is not obvious.

Additionally, if the modification of the references as cited were obvious, it would have already been attempted by another who is skilled in the art since it is known that temperatures and pressures in autoclave reactors are extreme. However, this has not been attempted, let alone suggested, except by Applicants.

Also, there are secondary considerations that indicate Applicant's claim 1 was not obvious. As evidenced by Applicant' specification, there was a long felt need for an apparatus that could measure concentrations of slurries under the hostile conditions present when performing such an operation. Rao, issued almost 20 years ago, supports this proposition because Rao acknowledges the presence of high temperatures and pressures in autoclave reactors in his title. However, the idea of isolating the transducers had not been attempted in this field since the issuance of Rao despite the knowledge that transducers measuring properties of slurries are exposed to high temperatures and pressures. Therefore, the need of transducers that can measure concentrations and particle size of slurries under high temperatures and pressures lends support to Applicants' view that claim 1 was not obvious and that the knowledge was not available to one skilled in the art.

For the aforementioned reasons, Applicants respectfully disagree with Examiner's assertion that claim 1 is obvious in light of the references cited, and kindly requests that claim 1 be allowed.

Similarly, claim 2, which is dependent on original claim 1, is believed to distinguish over Rao in view of Bran for the same reasons as recited above for claim 1. Additionally, the prior art did not find it necessary to cool the transducers in order to operate satisfactorily, nor did the prior art suggest it might be necessary to lower the temperature that the transducers operate in. The view of the prior art was that the transducers could operate under the temperatures that they were exposed to from inside the container. The teachings of the prior art found in the specification diverge from those of Applicant's that the transducer can operate better and for a longer period of time despite the environmental conditions within the container. The knowledge of cooling or lowering the operating temperature of the transducers was clearly not apparent to one skilled in the art or else it would have been attempted in the twenty years since Rao issued, or since transducers have been used in such environments; the previous methods were thought to be superior as is evident from their existence for such a long period of time without any change. Because the knowledge of cooling the transducers to enhance operation was not generally available to one skilled in the art, it would not have been obvious for one to modify the apparatus for measuring slurry concentrations by cooling the transducers, and Applicant kindly requests that Examiner allow claim 2.

Claim 3 is dependent on claim 2 and believed to distinguish over the references cited by Examiner for the reasons stated above in the discussion of claims 1 and 2.

Claim 4 is believed to distinguish over Rao in view of Bran for the reasons recited above for claim 1-3 as a result of claim 4 being dependent on claim 3.

Claim 5, dependent on claim 4, is believed to distinguish over the references cited for the same reasons enumerated above for claims 1-4.

Applicant respectfully disagrees with Examiner's assertion that claim 16 is unpatentable over Rao in view of Bran. The teachings of Bran and Rao have previously been discussed. Examiner stated that Bran in being used to show that use of a coupler for cooling the transducer is well known in the art, which Applicant has previously responded to in the discussion above for claims 1-5. See Office Action 3/3/05, page 8, line 7-8. However, Rao does not teach a connector that attaches an acoustic member to the container. Even if it were interpreted as such, Rao does not teach a connector that is isolated from the acoustic member, as does Applicant. In claim 16, Applicant recites that the "connector and acoustic member are thermally *isolated* from one another...." See Applicants Original claim 16, page 30, lines 16-17. Therefore, the absence of any teaching or suggestion in Rao or Bran of a connector and of a connector isolated from the acoustic member and the absence of the general knowledge available to one of ordinary skill in the art indicates that Applicant's original claim 16 is not obvious and should be allowed.

Applicant kindly thanks Examiner for stating that claims 17-19 would be allowable if rewritten in independent form, however, Applicant maintains that these claims are also allowable for the same reasons as claim 1.

Additionally, in response to the Examiner's objections, claims 15 has been rewritten in independent form as not to depend on a rejected base claim.

CONCLUSION

For the foregoing reasons, Applicant respectfully requests that the Examiner allow Original claims 1-5, 16, previously presented claim 17-19 and currently amended claim 15 as indicated on the attached complete listing of claims. Applicant kindly thanks Examiner for allowing claims 6-14 and for stating that claims 17-19 would be patentable if rewritten in independent form.

Respectfully submitted,

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Attachment(s)

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